

REMARKS

This application has been carefully reviewed in light of the Office Action dated June 23, 2009. Claims 1 to 9 are currently in the application, with claims 8 and 9 having been newly added. Claims 1, 4, 8 and 9 are the independent claims. Reconsideration and further examination are respectfully requested.

Allowable Subject Matter

Initially, Applicant thanks the Examiner for the indication that claims 2 and 5 contain allowable subject matter and would be allowable if rewritten in independent form. These claims have not been rewritten in independent form at this time as all claims currently in the application are believed to be in condition for allowance, as discussed in more detail below.

Claim Rejections - 35 U.S.C. § 102

Claims 1, 3, 4 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,605,042 (“Stutzenberger”). Applicant has reviewed the applied reference and respectfully submits that the claimed invention is patentably distinguishable over this reference for at least the following reasons.

Independent claim 1 is directed to an exhaust gas purifying apparatus for an engine. The apparatus includes a reduction catalyst which is arranged in an exhaust system of the engine, for reducing and purifying nitrogen oxide in an exhaust gas using a reducing agent, and reducing agent supply means having an injection nozzle which is supplied with a reducing agent together with compressed air and atomizes the reducing agent, and which injection-supplies this to an exhaust gas on an upstream side of the reduction catalyst inside an exhaust gas passage of the exhaust system. A temperature detection means is provided in the vicinity of the injection nozzle on the upstream side in the exhaust gas passage, which detects the exhaust gas temperature inside

the exhaust gas passage. The reducing agent supply means uses a detection signal of the exhaust gas temperature from the temperature detection means to set, for that exhaust gas temperature, a supply quantity of reducing agent and compressed air at or above a lower limit for cooling the interior of the injection nozzle to below a temperature at which the reducing agent crystallizes, and supplies reducing agent and compressed air to the injection nozzle.

As indicated above, independent claim 1, as well as claim 2, has been amended to specify that the reducing agent supply means sets a supply quantity of reducing agent and compressed air at or above a lower limit for cooling the interior of the injection nozzle to below a temperature at which the reducing agent crystallizes and supplies the reducing agent and compressed air to the injection nozzle. Support for this amendment may be found at least in the paragraph beginning on page 17, line 18, of the specification. The applied reference is not seen to disclose or suggest at least these features of the claimed invention.

Stutzenberger concerns a metering device 4 that includes a metering valve 6 for metering a reducing agent and a control valve 5 for controlling the supply of compressed air. As described in column 2, lines 61 to 67, of Stutzenberger, the metering device 4 comprises a cooling device 7 which includes a cooling jacket 9 for circulating cooling water from the cooling water circuit of an engine around a common carrier body 8 of the metering device 4. Stutzenberger is seen to rely on the cooling water from the engine to cool the metering device 4 and not the reducing agent delivered through the metering valve 6. While Stutzenberger does acknowledge intermediate cooling provided by the flow of compressed air at column 4, lines 46-48, nothing in Stutzenberger is seen to disclose varying the supply of reducing agent and compressed air to cool the metering device 4. Accordingly, Stutzenberger is not seen to disclose or suggest at least the features of setting a supply quantity of reducing agent and compressed air at or above a lower

limit for cooling the interior of an injection nozzle to below a temperature at which the reducing agent crystallizes and supplying the reducing agent and compressed air to the injection nozzle.

Therefore, independent claim 1 is believed to be allowable over Stutzenberger.

Reconsideration and withdrawal of the § 102(b) rejection of independent claim 1 are respectfully requested.

Independent claim 4 is directed to an exhaust gas purifying apparatus for an engine. The apparatus includes a reduction catalyst which is arranged in an exhaust system of an engine, for reducing and purifying nitrogen oxide in an exhaust gas using a reducing agent, and reducing agent supply means having an injection nozzle which is supplied with a reducing agent together with compressed air and atomizes the reducing agent, and which injection-supplies this to an exhaust gas on an upstream side of the reduction catalyst inside an exhaust gas passage of the exhaust system. Temperature detection means is provided in the vicinity of the injection nozzle on the upstream side of the exhaust gas passage, which detects the exhaust gas temperature inside the exhaust gas passage. The reducing agent supply means is provided with pressure detection means for detecting an internal pressure of the injection nozzle, and uses a detection signal of the internal pressure of the injection nozzle to stop supply of compressed air and reducing agent to the injection nozzle when the internal pressure reaches or exceeds a predetermined value, and uses a detection signal of the exhaust gas temperature from the temperature detection means to restart supply of compressed air and reducing agent to the injection nozzle when the exhaust gas temperature in the vicinity of the injection nozzle reaches or exceeds the melting point of the reducing agent.

The applied reference is not seen to disclose or suggest the foregoing features of independent claim 4. In particular, Stutzenberger is not seen to disclose or suggest at least the

features of stopping the supply of compressed air and reducing agent to an injection nozzle when a detected internal pressure of the injection nozzle reaches or exceeds a predetermined value and restarts supply of the compressed air and reducing agent when a detected temperature of exhaust gas in the vicinity of the injection nozzle reaches or exceeds the melting point of the reducing agent.

The Office Action references col. 3, lines 21-51, of Stutzenberger as disclosing the detection of the internal pressure of an injection nozzle and stopping the supply of compressed air and reducing agent when the detected internal pressure reaches or exceeds a predetermined value. Applicant respectfully disagrees. Nothing in the cited portion of Stutzenberger mentions a detector for detecting the internal pressure of an injection nozzle. Stutzenberger describes pressure relief valves 20 and 23, however, these valves are seen to merely regulate the pressures in lines 16 and 22, respectively. Neither of these pressure relief valves are seen to detect a pressure let alone generate a detection signal. Furthermore, the delivery of compressed air and reducing agent in Stutzenberger is seen to be independent of the operation of the pressure relief valves and, more particularly, is not stopped when an internal pressure reaches or exceeds a predetermined value. Rather, the pressure relief valves are seen to simply bleed off extra pressure to maintain a desired pressure in the respective lines.

The Office Action further references col. 3, lines 21-51, and col. 4, lines 47-62, of Stutzenberger as disclosing the use of a detection signal of exhaust gas temperature to restart supply of compressed air and reducing agent to an injection nozzle when the exhaust gas temperature in the vicinity of the injection nozzle reaches or exceeds the melting point of the reducing agent. Again, Applicant respectfully disagrees. The cited portions of Stutzenberger simply refer to the standard delivery of compressed air within the system and the continued

delivery of compressed air and circulation of engine cooling water for a period of time after the engine has been stopped. Nothing in the cited portions of Stutzenberger is seen to describe starting or stopping the delivery of compressed air and reducing agent based on a detected temperature of exhaust gas in the vicinity of an injection nozzle. Furthermore, nothing in Stutzenberger is seen to reference the melting point of a reducing agent, let alone controlling (*e.g.*, restarting) the delivery of compressed air and reducing agent based on a detected exhaust gas temperature reaching or exceeding the melting point.

Therefore, independent claim 4 is believed to be allowable over Stutzenberger.

Reconsideration and withdrawal of the § 102(b) rejection of independent claim 4 are respectfully requested.

Claims 3 and 6 are dependent from independent claims 1 and 4, respectively, and therefore are believed to be allowable over Stutzenberger for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

Claim Rejections - 35 U.S.C. § 103

Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Stutzenberger in view of design choice. Claim 7 is dependent from independent claim 4 discussed above and therefore is believed to be allowable over the Stutzenberger for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

New Claims

New claims 8 and 9 are apparatus claims which correspond with independent claims 1 and 4, respectively. Accordingly, claims 8 and 9 are believed to be allowable over the applied reference for at least the same reasons as discussed above with respect to claims 1 and 4.

Conclusion

The absence of a reply to a specific rejection, issue, or comment does not signify agreement with or concession of that rejection, issue, or comment. In addition, because the arguments made above may not be exhaustive, there may be other reasons for patentability of any or all claims that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment or cancellation of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment or cancellation.

In view of the foregoing amendment and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Application No.: 10/574,341

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 502203 and please credit any excess fees to such deposit account.

Respectfully submitted,

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